

### **REMARKS**

In this response, claims 1 and 42 have been amended, new claim 48 have been added. The amendments are fully supported by the originally filed application. Thus, no new matter is introduced. Reconsideration of pending claims 15-42 and 48 is respectfully requested.

#### **Rejections under 35 U.S.C. § 112**

Claims 15-20 stand rejected for allegedly being indefinite. Applicant has amended independent claim 15 to clarify that the coating material comprises three parts: a binding agent, at least one filler, and a photocatalytically active agent. Accordingly, Applicants respectfully request that the rejection to independent claim 15 and associated dependent claims 16-42 be withdrawn.

#### **Rejections under 35 U.S.C. § 102**

Claims 15-23 and 30-40 stand rejected under 35 U.S.C. § 102(b) as being anticipated by or, in alternative, under 35 U.S.C. § 103(a) as being obvious over Watanabe (US 6,337,129). Applicant respectfully traverses the rejection for the following reasons.

Applicant has amended independent claim 15 to include features from associated dependent claim 42. Claim 15 is now directed towards a coating material that includes, among other features,

a binding agent in an amount of about 10 to about 30 weight percent of the coating material;  
at least one filler ...; and  
a photocatalytically active agent;  
wherein the binding agent is capable of decomposing ... by a photocatalytic action of the photocatalytically active agent to form a microstructured, self-cleaning surface that photocatalytically reduces by about 0.1  $\mu$ m or more per year in response to external weathering ...

The newly added features directed toward the amount of binding agent in the coating material may be found throughout the specification, e.g., paragraph [0032], lines 1-3 of the originally filed English language specification.

The Examiner alleged that Watanabe discloses a surface coating comprising hydrophobic resin and a photocatalytic oxide, and appears to equate Watanabe's hydrophobic resin and a photocatalytic oxide with the recited *binding agent* and the recited *photocatalytically active agent*, respectively.

Watanabe discloses a hydrophobic resin layer 24 (e.g., see Fig. 3 of Watanabe), and discloses that the "thickness of the hydrophobic resin layer 24 is preferably about 10 nm to 10 .mu.m, more preferably about 100 nm to 1 .mu.m."<sup>1</sup> Watanabe, for example, discloses exemplary compositions comprising five parts by weight of a binding agent, the latter being preferably silicon.<sup>2</sup> Watanabe, however, does not disclose or even suggest that the hydrophobic resin layer 24 is about 10 to about 30 weight percent of the coating material.

Also, in response to Watanabe's photoexcitation of the photocatalyst, "organic groups bonded to silicon atoms in a silicone molecule on the surface of the coating are substituted by hydroxyl groups and the coating is hydrophilified."<sup>3</sup> According to col. 4, lines 9 to 25 of Watanabe, such modification is reversible. Thus, regardless of the amount of binding agent, none of Watanabe's silicon based compositions is capable of decomposing by a photocatalytic action of the photocatalytically active agent to form a microstructured, self cleaning surface that photocatalytically reduces by about 0.1  $\mu\text{m}$  or more per year. This is because, in Watanabe, the reversible replacement of organic groups (being bonded to the binding agent) by hydroxyl groups will not result in a photocatalytically reduction of the corresponding self-cleaning surface by about 0.1  $\mu\text{m}$  or more per year, as recited in claim 15.

Furthermore, paragraph [00211] on page 8 of the Applicant's specification makes it clear that the controlled decomposition of the binding agent is an essential element for providing self-cleaning surfaces according to the present disclosure, as recited in claim 15. Watanabe does not disclose any such controlled decomposition of its hydrophobic

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<sup>1</sup> Watanabe, col. 14, lines 43-46.

<sup>2</sup> Watanabe, col. 19, lines 1-2, and lines 51-52.

<sup>3</sup> Watanabe, col. 19, lines 30-34.

resin. Accordingly, even though Watanabe discloses a coating comprising a hydrophobic resin, a filler, and a photocatalytic oxide, Watanabe's coating will not result in self-cleaning surface, as recited in claim 15.

The Examiner also opinioned that "Wanatabe further teaches that the amount of hydrophobic binder may be controlled as desired" (page 12, lines 4-5 of the Office Action, underlining added). However, considering that Watanabe does not teach self-cleaning surfaces, which are also self-regenerating, there is no indication in Watanabe or known to those skilled in the art about what constitutes a "desired" amount of hydrophobic binder.

As mentioned herein before, paragraph [00211] on page 8 of the Applicant's specification makes it clear that the controlled decomposition of the binding agent is an essential element for providing self-cleaning, self-regenerating surfaces according to the present invention. For example, the speed of the composition is set in such a way that it is greater than the speed of the composition of conventional materials with surface treated photocatalytically active agents, but remains low enough that undesired chalking is avoided. Said speed can be adjusted inter alia by the amount of binding agent.

Therefore, discovering the suitable amount of photocatalytically degradable binding agent, and specific way of controlled decomposition of the binding agent, involves a lot more than only routine skill in the art, namely an inventive activity. As Watanabe does not disclose the suitable amount of photocatalytically degradable binding agent and specific way of controlled decomposition of the binding agent, the coating material disclosed in Watanabe will not result in self-cleaning surface, as recited in claim 15.

For at least these reasons, Applicant respectfully submits that Watanabe does not disclose or suggest the features of claim 15. Accordingly, claim 15 is allowable over Watanabe, along with associated dependent claims 16-23 and 30-40.

**Rejections under 35 U.S.C. § 103**

Claims 15-20, 24, and 30-41 stand rejected under 35 U.S.C. § 103(a) as being obvious over Murasawa et al. (US 5,547,823), in view of Escaffre et al. (WO99/51345), wherein (US 2004/0204314) is used as an English Equivalent. Applicant respectfully traverses the rejection for the following reasons.

Independent claim 15 is directed towards a coating material that includes, among other features,

a binding agent in an amount of about 10 to about 30 weight percent of the coating material;

... binding agent is capable of decomposing ... by a photocatalytic action of the photocatalytically active agent to form a microstructured, self-cleaning surface that photocatalytically reduces by about 0.1 µm or more per year in response to external weathering...

The Examiner alleged that Murasawa discloses a coating composition comprising a less degradative adhesive and photocatalyst particles.

Murasawa teaches away from the present recited features, by suggesting that the photocatalytical degradation of the binding agent is to be eliminated completely, if possible.<sup>4</sup>

Murasawa discloses several exemplary embodiments in her disclosure. For example, "Example 1" and "Example 3" of Murasawa discloses a composition, wherein the binding agent would not be degraded at all (e.g., see Fig. 1 of and col. 8, lines 36 to 39 of Murasawa). Thus, the composition of Examples 1 and 3 of Murasawa would not result in a self-cleaning surface that is photocatalytically reduced by about 0.1 µm or more per year in response to external weathering, as recited in claim 15.

On the other hand, in "Comparative Example 1," Murasawa discloses a composition whose binding agent would be almost completely degraded by photocatalysis within only a few of hours (e.g., see Fig. 1 of Murasawa). This is in contrast to claim 15, which recites a photocatalytically reduction of 0.1 µm or more per year.

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<sup>4</sup> Col. 3, lines 9 of Murasawa.

Murasawa does not disclose or even suggest a microstructured, self cleaning surface that is photocatalytically reduced by about 0.1  $\mu\text{m}$  or more per year. To the contrary, Murasawa discloses the binding agent either having almost a 0 degradation rate, or degrading almost completely within a few hours (see Fig. 1).

Furthermore, claim 15 recites a coating composition comprising about 10 to about 30 wt.-% of binding agent, as recited in claim 15. This specific selection of the binding agent allows for providing self-cleaning surfaces, which are automatically regenerated due to the controlled decomposition of the photocatalytically degradable binding agent. Murasawa also does not disclose or even suggest such composition.

Escaffre, the other reference cited in the Office Action, does not cure these deficiencies of Murasawa.

For at least these reasons, Applicant respectfully submits that Murasawa and Escaffre, either alone or in combination, do not disclose or suggest the features of claim 15. Accordingly, claim 15 is allowable over Murasawa and Escaffre, along with associated dependent claims 16-23 and 30-40.

Claims 21-29 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Watanabe in view of Chopin et al. (US 6,037,289). Claims 21-29 depend from allowable independent claim 15. Chopin arguably teaches adding catalyst and additives to  $\text{TiO}_2$  particles to amplify the photocatalytic effects. Chopin, however, does not cure the deficiencies Watanabe, Murasawa or Escaffre, with respect to allowable claim 15. Accordingly, claims 21-29 are allowable for at least the reasons claim 15 is allowable.

Claims 21-23 and 25-29 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Murasawa and Escaffre, in view of Chopin. Claims 21-23 and 25-29 depend from allowable independent claim 15. Chopin arguably teaches adding catalyst and additives to  $\text{TiO}_2$  particles to amplify the photocatalytic effects. Chopin, however, does not cure the deficiencies Watanabe, Murasawa or Escaffre, with respect to

allowable claim 15. Accordingly, claims 21-23 and 25-29 are allowable for at least the reasons claim 15 is allowable.

#### **New Claim**

New claim 48 has been added. Claim 48 includes features of original claim 42. Claim 48 indirectly depends from allowable independent claim 15, and is allowable for at least the reasons claim 15 is allowable.

#### **Conclusion**

For at least these reasons, a Notice of Allowance is earnestly solicited. Please contact the undersigned at (503) 796-2883 regarding any questions or concerns associated with the present matter. If any fees are due in connection with this paper, the Commissioner is authorized to charge Deposit Account 500393.

Respectfully submitted,  
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